Early psychological counseling for the prevention of posttraumatic stress induced by acute coronary syndrome: the MI-SPRINT randomized controlled trial

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Abstract: BACKGROUND: Acute coronary syndrome (ACS)-induced posttraumatic stress disorder (PTSD) and clinically significant PTSD symptoms (PTSS) are found in 4 and 12% of patients, respectively. We hypothesized that trauma-focused counseling prevents the incidence of ACS-induced PTSS. METHODS: Within 48 h of hospital admission, 190 patients with high distress during ACS were randomized to a single-session intervention of either trauma-focused counseling or an active control intervention targeting the general role of stress in patients with heart disease. Blind interviewer-rated PTSS (primary outcome) and additional health outcomes were assessed at 3 months of follow-up. Trial results about prevalence were compared with data from previous studies on the natural incidence of ACS-induced PTSS/PTSD. RESULTS: Intention-to-treat analyses revealed no difference in interviewer-rated PTSS between trauma-focused counseling (mean, 11.33; 95% Cl, 9.23-13.43) and stress counseling (9.88; 7.36-12.40; p = 0.40), depressive symptoms (6.01, 4.98-7.03, vs. 4.71, 3.65-5.77; p = 0.08), global psychological distress (5.15, 4.07-6.23, vs. 3.80, 2.60-5.00; p = 0.11), and the risk for cardiovascular-related hospitalization/all-cause mortality (OR, 0.67; 95% CI, 0.37-1.23). Self-rated PTSS indicated less beneficial effects with trauma-focused (6.54; 4.95-8.14) versus stress counseling (3.74; 2.39-5.08; p = 0.017). The completer analysis (154 cases) confirmed these findings. The prevalence rates of interviewer-rated PTSD (0.5%, 1/190) and self-rated PTSS were in this trial much lower than in meta-analyses and observation studies from the same cardiology department. CONCLUSIONS: Benefits were not seen for trauma-focused counseling when compared with an active control intervention. Nonetheless, in distressed ACS patients, individual, single-session, early psychological counseling shows potential as a means to prevent posttraumatic responses, but trauma-focused early treatments should probably be avoided.

DOI: https://doi.org/10.1159/000486099

Regular Article

Psychotherapy and Psychosomatics

Psychother Psychosom
DOI: 10.1159/000486099

Received: July 6, 2017
Accepted after revision: December 4, 2017
Published online: February 21, 2018

Early Psychological Counseling for the Prevention of Posttraumatic Stress Induced by Acute Coronary Syndrome: The MI-SPRINT Randomized Controlled Trial

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Keywords

Acute coronary care · Behavioral cardiology · Emergency psychiatry · Myocardial infarction · Posttraumatic stress disorder · Prevention · Psychological stress · Trauma stress

Abstract

Background: Acute coronary syndrome (ACS)-induced posttraumatic stress disorder (PTSD) and clinically significant PTSD symptoms (PTSS) are found in 4 and 12% of patients, respectively. We hypothesized that trauma-focused counseling prevents the incidence of ACS-induced PTSS. ***Methods:*** Within 48 h of hospital admission, 190 patients with high distress during ACS were randomized to a single-session intervention of either trauma-focused counseling or an active control intervention targeting the general role of stress in patients with heart disease. Blind interviewer-rated PTSS (primary outcome) and additional health outcomes were assessed at 3 months of follow-up. Trial results about prevalence were compared with data from previous studies on the natural incidence of ACS-induced PTSS/PTSD. ***Results:*** Intention-to-treat analyses revealed no difference in interviewer-rated PTSS between trauma-focused counseling (mean, 11.33; 95% CI, 9.23–13.43) and stress counseling (9.88; 7.36–12.40; $p = 0.40$), depressive symptoms (6.01, 4.98–7.03, vs. 4.71, 3.65–5.77; $p = 0.08$), global psychological distress (5.15, 4.07–6.23, vs. 3.80, 2.60–5.00; $p = 0.11$), and the risk for cardiovascular-related hospitalization/all-cause mortality (OR, 0.67; 95% CI, 0.37–1.23). Self-rated PTSS indicated less beneficial effects with trauma-focused (6.54; 4.95–8.14) versus stress counseling (3.74; 2.39–5.08; $p = 0.017$). The completer analysis (154 cases) confirmed these findings. The prevalence rates of interviewer-rated PTSD (0.5%, 1/190) and

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self-rated PTSS were in this trial much lower than in meta-analyses and observation studies from the same cardiology department. ***Conclusions:*** Benefits were not seen for trauma-focused counseling when compared with an active control intervention. Nonetheless, in distressed ACS patients, individual, single-session, early psychological counseling shows potential as a means to prevent posttraumatic responses, but trauma-focused early treatments should probably be avoided.

Introduction

Posttraumatic stress disorder (PTSD) is a psychiatric disorder that may develop in individuals who had been exposed to a traumatic or stressful event, including experiences involving threatened death or serious injury [1]. During acute coronary syndrome (ACS), at least 70% of patients experience moderate to intense fear of dying and distress [2]. The incidence of ACS-induced PTSD and clinically relevant posttraumatic stress symptoms (PTSS) is 4 and 12%, respectively [3]. Patients with ACS-induced PTSS re-experience the cardiac event, for instance, in intrusive daytime memories or nightmares, avoid ACS-related stimuli, have negative thoughts or feelings about the cardiac event, and show hyperarousal, such as heightened startle reaction and disturbed sleep [4]. To meet diagnostic criteria, PTSS must last for more than 1 month and cause clinically relevant distress or impairment in daily functioning [1].

ACS-induced PTSD does not only reduce quality of life [5], but also doubles the risk for adverse clinical outcomes, including major adverse cardiac events and all-cause mortality, independently of traditional risk factors of cardiovascular disease (CVD) [3]. Unfavorable health behaviors, low adherence to cardiac therapy, psychiatric comorbidity, sleep disturbances, and direct pathophysiologic and cardiometabolic effects have been postulated as mechanisms contributing to poor prognosis [6].

Owing to the health consequences of ACS-induced posttraumatic stress, early interventions to lower the incidence of PTSD seem reasonable but such studies are lacking [6], one important reason for this being the challenge to choose the appropriate intervention for these patients. Single-session individual early debriefing aims at alleviating stress reactions within several hours or days of trauma exposure, but it did not reduce psychological distress or prevent PTSD onset [7, 8], so debriefing is not recommended anymore [9]. Debriefing may even be harmful and increase PTSD risk when emotional catharsis is encouraged in the acute setting and delivered to all exposed persons regardless of initial distress severity [10].

Alternative psychological first aid approaches are based on an empathic assessment of current, accurate needs of trauma survivors [8]. Pragmatic, practical psychological support should be provided, including information about possible (posttraumatic) stress reactions and symptoms, coping strategies for self-guided help, and how to access social support and professional help [8]. In the acute phase, the focus should be on trauma survivors who can be identified to have a high risk of developing clinically significant PTSS, based on early predictors of PTSD [10]. Such predictors could be used to screen for patients with a high risk of developing ACS-induced PTSD/PTSS. Two large studies have been conducted about this topic so far. One study in about 400 ACS patients found female sex, perceived threat to and feelings of intense fear and helplessness during ACS, depressive and acute stress symptoms as risk factors of interviewer-rated PTSS 1 month after the event [11]. Similarly, our group previously found in 394 patients that fear of dying and helplessness predicted clinically assessed ACS-induced PTSD 3 months after ACS [12]. High distress during ACS, fear of dying and helplessness, along with acute pain, might serve as indicators for screening tools for the incidence of PTSS/PTSD after ACS [11–14]. Acknowledging that specific patients are at risk to develop PTSD after ACS, the already available evidence about risk factors, and the established first-aid interventions, the question as to whether the incidence of ACS-induced PTSD/PTSS can be reduced by such interventions guided this study.

Specifically, the aim of this randomized-controlled trial (RCT) was to test whether 1 single session of early trauma-focused counseling with a psychological first-aid approach prevents the incidence of PTSS in patients with high distress during ACS [15]. Trauma-focused counseling was tested against an active stress counseling control intervention. The primary hypothesis was that trauma-focused counseling results in 20% less of interviewer-rated PTSS than stress counseling at 3 months of follow-up. Secondary group comparisons were performed on additional mental and physical health outcomes.

Materials and Methods

Study Participants and Trial Design

Consecutive patients with verified acute ST elevation myocardial infarction (STEMI) or non-STEMI, referred for acute coronary care intervention to the Cardiology Department, Bern Uni-

versity Hospital, Switzerland, were invited between February 2, 2013, and September 29, 2015, to participate in the Myocardial Infarction-Stress Prevention Intervention (MI-SPRINT) RCT. The study protocol has previously been published [15].

The inclusion criteria were: age 18 years or older; stable circulatory conditions, and high level of acute distress during MI, using numeric rating scales (scores 0–10) for "pain intensity (during MI)," "fear of dying (until admission to the coronary care unit)," and "making sorrows and feeling helpless (when being told about having MI)." For this RCT, "high acute distress during ACS" was defined a priori on the basis of a score of at least 5 for pain plus at least 5 for fear of dying and/or helplessness [15]. The exclusion criteria were: emergency coronary artery bypass grafting; comorbid disease likely to cause death within 1 year; not fully oriented to situation, person, and place; cognitive impairment per an adapted short version of the Mini-Mental State Examination (score <7; maximum score = 9); current severe clinical depression according to the cardiologist's history; suicidal ideations in the previous 2 weeks; inadequate knowledge of German; or current participation in another RCT.

The investigator-initiated MI-SPRINT was conducted in accordance with the Declaration of Helsinki and the guidelines on Good Clinical Practice and registered under ClinicalTrials.gov (NCT01781247). The study was monitored by the independent Clinical Trials Unit, Faculty of Medicine, University of Bern. As early psychological debriefing had caused harm in some earlier studies [7–10], monitoring included a preplanned interim/safety analysis after the first 130 patients on the primary outcome of interviewer-rated PTSS, which revealed no significant group difference between both treatments. The ethics committee of the State of Bern approved the study protocol (KEK No. 170/12). All patients gave written informed consent. None received financial compensation.

Randomization and Masking

The study was a single-blinded 2 parallel group behavioral RCT with 2 active face-to-face interventions of the same duration and attention, performed by the bedside within premises of the coronary care unit. Within 48 h after having reached stable hemodynamic conditions, all eligible patients underwent a structured medical history and psychometric assessment. After including a patient, the research staff called the study center where an independent person randomly allocated participants to trauma-focused counseling (intervention group) or stress counseling (control group). The randomization list for group allocation was created with Research Randomizer (www.randomizer.org) and became accessible to investigators only after the follow-up assessment of the last patient.

Interventions

Master-level psychologists and medical students, trained and supervised by senior clinical psychotherapists with degrees in psychology or psychiatry, delivered the interventions. Each of the 5 persons who delivered the intervention delivered both interventions. Medical students with formation in communication skills passed through a 2-day (16 h) training course before they carried out the face-to-face intervention independently. Each intervention consisted of 1 single session of individual counseling of 45 min duration which was based on colored information booklets, tailored to the intervention strategy (online suppl. Booklets; see www.karger.com/doi/10.1159/000486099 for all online suppl. material). The information booklets were handed out at the end of the sessions, and patients took them home for further self-guided help. The booklets were used for interacting with the patient during the counseling session and to deepen specific topics as shown in Table 1 (online suppl. Intervention Manuals).

Table 1. Examples of specific topics that could be covered during 45 min of counseling in each group

Trauma-focused counseling intervention group	Stress counseling control group
What is a trauma? What is posttraumatic stress disorder? Why can a heart attack be understood as a traumatic experience?	What is psychosocial stress and when can it become dangerous? Stress appraisal and coping; emotional and biological stress reactions
What are the most common reactions to a traumatically experienced heart attack (including posttraumatic reactions)?	Which types of psychosocial stress are known to potentially impact on heart disease and its prognosis (e.g., job stress and family stress)?
Why do some patients react traumatically to a heart attack and others do not?	Why do not all people react the same way to stressful situations?
How to cope with a heart attack as a trauma? How to cope with avoidance, safety behaviors, anxiety, anger/irritability, sleeping problems?	How can psychosocial stress affect a healthy lifestyle, adherence to cardiac therapy, and cardiovascular biology?
How to get professional help?	How can stress be managed?

After a 5-min introduction phase in both intervention groups, during which patients were informed about the setting of the study, the subsequent 40-min counseling intervention, either trauma-focused counseling or stress counseling, took place. In the trauma-focused counseling group, the concept of psychological trauma and symptoms of PTSD were explained. The study therapists offered practical coping strategies that could be applied should PTSS occur after MI [16, 17]. The trauma-focused counseling intervention applied an educational and resource-oriented approach, targeting individual patient resources and cognitive (re)structuring to specifically prevent MI-induced traumatic reactions.

Although cardiology clinics do not currently deliver routine early psychological care for traumatized cardiac patients, we felt it both unethical and not sufficient to withhold active psychological guidance from highly distressed patients as a "usual care" control condition [18], since our earlier study showed a high incidence of clinically relevant self-rated PTSS in this patient group [19]. Therefore, our second intervention was an active control condition – labeled stress counseling – where patients received information about the general role and consequences of psychosocial stress in CVD and how to manage stress to promote health behavior and everyday functioning after MI [20].

Basically, both interventions applied principles of psychological first aid [10], but the content of education, information, resource activation, and cognitive (re)structuring was largely different (i.e., trauma-related vs. non-trauma-related issues). In other words, in contrast to the trauma-focused counseling session, the stress counseling active control intervention completely avoided any terminology related to "trauma." It was theorized that education about posttraumatic stress reactions would result in better coping with PTSS and ultimately lower levels of PTSS in the trauma-focused counseling group compared to the effects of the active control intervention which did not conceptualize MI as a trauma.

Baseline Measures

Education was assessed with 3 categories: university graduation, including applied sciences/high school graduation; apprenticeship or vocational school; lower than apprenticeship or vocational school. The body mass index was calculated based on weight and height disclosed by patients. Smoking was assessed in terms of current, former and never smokers. Information on diabetes, hypertension, high cholesterol, and previous MI were obtained through history. Left ventricular ejection fraction was obtained from angiography records and the risk of postdischarge death and recurrent MI after ACS with the Global Registry of Acute Coronary Events (GRACE) risk score [21]. Depression was assessed in terms of lifetime depression history and – to minimize overall questionnaire burden at admission – with the 13-item cognitive depressive symptom subscale of the Beck Depression Inventory (BDI; total score 0–39) [22], a reliable assessment tool for depressive symptom levels in patients with coronary heart disease [23]. Use of antidepressant medications was also noted. The Acute Stress Disorder Scale was used to self-rate symptoms of dissociation, re-experiencing, avoidance, and arousal that had occurred since ACS (total score 0–76) [24]. PTSD cases due to traumatic experiences in the 3 months prior to current ACS were explored with a 3-item screener [25].

Outcome Assessment and Measures

All patients were invited to undergo the outcome assessment 3 months after ACS. Outcome assessors were blinded to group assignments. The primary outcome was the total score of the validated German version [26] of the Clinician-Administered PTSD Scale (CAPS) [27]. An interviewer rates the frequency and intensity of each of the 17 PTSD symptoms in the prior month between 0 (never) and 4 (almost always) to obtain a total PTSS severity score (range 0–136). A symptom is given when frequency is at least 1 point and intensity is at least 2 points. One of 5 symptoms is required for the re-experiencing cluster, 3 of 7 symptoms for the avoidance cluster, and 2 of 5 symptoms for the hyperarousal cluster. Patients who meet criteria for all 3 clusters are given a psychiatric diagnosis of PTSD. The German version of the CAPS shows good internal consistency for the severity score of all 17 symptom items (Cronbach's $\alpha = 0.88–0.92$) and for each of the 3 PTSS clusters ($\alpha = 0.73–0.88$) [26]. The CAPS was scored by the same person who also performed the CAPS interview.

As a secondary outcome, the severity of self-rated ACS-induced PTSS was assessed with the 17-item Posttraumatic Diagnostic Scale (PDS) based on how often patients had experienced each PTSD symptom during the past month in reference to the MI event (total score 0–51) [28]. Further secondary outcomes were depressive symptoms (total score of cognitive and somatic symptoms combined 0–63) and global psychological distress (total score 0–36), measured, respectively, with the 21-item BDI [22] and the 9-item short form of the Symptom Checklist-90-Revised (SCL-90-R) [29]. As an exploratory outcome, we assessed the combined end point of elective or emergency CVD-related hospitalizations (minimal hospital stay of 24 h) with all-cause mortality through patient interview or medical charts.

As part of the outcome assessment, we also asked patients to rate how helpful they had found the information booklet for self-guided help ("not at all helpful," "a little helpful," "quite helpful," "very helpful") and whether they had undergone psychotherapy since hospital discharge.

Power Analysis

As mentioned above, we selected the CAPS total score as our primary outcome measure because interviewer-diagnosed PTSS are more clinically meaningful than self-reported symptoms. However, due to the lack of CAPS data in the literature on the incidence of PTSS after ACS, reflecting the usual care of this patient population, the power analysis is based on our previously published self-report PDS data [19]. We assumed that patients with a high risk of developing PTSD show a 2.9 ± 10.1 point difference in PDS scores 3 months after ACS, corresponding to a clinically meaningful 20% lower PDS score in the trauma-focused versus the stress counseling group [15]. To yield this difference significant with an alpha error level of $p = 0.05$ and a beta error level of 20%, the sample size is $n = 194$ for each group [15]. Despite vigorous efforts, this recruitment goal was not achieved, mainly due to the large number of early patient discharges after legal changes in Switzerland's health care system (Fig. 1).

Statistical Analysis

Data were analyzed using SPSS 22.0 for Windows (SPSS Inc., Chicago, IL, USA) with level of significance at $p < 0.05$. We report 2 different types of analyses. (1) In the intent-to-treat (ITT) analysis, we used the full data set with imputed scores for missing outcomes. Patients deceased at follow-up were not imputed and, therefore, the sample is reduced to 183 cases. We used education, fear of dying, helplessness, acute stress disorder symptom and cognitive depressive symptom scores at baseline as predictors for multiple imputations ($k = 5$) and the pooled analysis for the overall findings. (2) In the completer analysis we used only cases with a valid assessment of the outcome of interest. A comparison of completers and dropouts of the primary outcome (CAPS) on baseline characteristics revealed that dropouts were older, and that they also had more fear of dying and a greater GRACE score than patients remaining in the study (online suppl. Table 1).

We used a general linear model with the group (intervention vs. control) as fixed factor, controlling for sociodemographic (age, sex, education) and clinical baseline characteristics (GRACE score, PTSD screen, lifetime depression and pain intensity during ACS), which all were predictors of ACS-induced PTSD in previous studies [30]. The analyses were conducted for the primary outcome (CAPS) and all secondary outcomes (PDS, BDI, SCL-90-R). We calculated mean values with 95% confidence intervals (CI) and effect sizes for between-group differences, where 0.2, 0.5, and 0.8 indicate small, medium, and large effects, respectively. We calculated logistic linear regression analysis to compare groups on the exploratory outcome CVD-related hospitalizations/all-cause mortality. We did not adjust p values for multiple comparisons because of the pre-established hierarchy of outcomes.

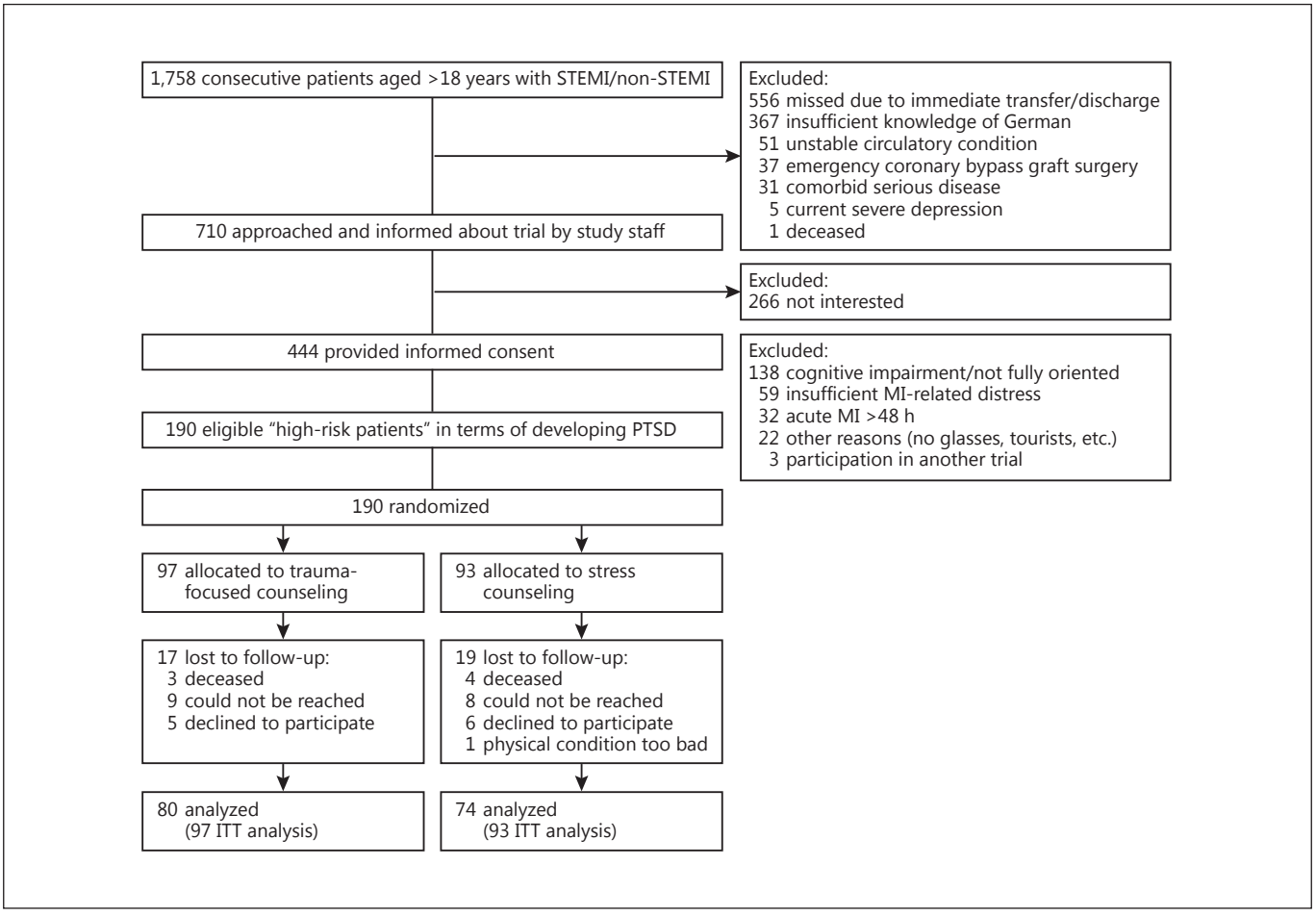

Fig. 1. Participant flow diagram of recruitment, randomization, and follow-up assessment. A total of 1,758 consecutive patients were potentially eligible for the study of whom 1,048 were excluded based on hospital charts or because they could not be approached (e.g., due to early discharge). Of the 710 patients who were approached for in-person screening, 266 uttered no interest to participate in the trial. Of those 444 who were interested and also provided informed consent, 254 had to be excluded as they did not meet inclusion criteria and for a few other reasons. This yielded a final sample of 190 patients who were randomized to trauma-focused counseling or stress counseling. ITT, intention to treat; MI, myocardial infarction; PTSD, posttraumatic stress disorder; STEMI, ST elevation myocardial infarction.

Results

Recruitment, Retention, and Baseline Characteristics

Figure 1 shows the flowchart of study participants. We randomized 190 patients to trauma-focused counseling ($n = 97$) or stress counseling ($n = 93$) of whom 154 (81.1%) completed the 3-month follow-up assessment: 80 (82.5%) in the trauma-focused counseling group and 74 (79.6%) in the stress counseling group. Table 2 shows the participants' baseline characteristics. Fear of dying during ACS was more intense in the trauma-focused than in the stress counseling group ($p = 0.026$); but there were no other significant group differences.

Effectiveness of the Intervention

Table 3 presents the comparison between trauma-focused counseling and stress counseling on primary and secondary outcomes for both the ITT and the completer analysis. In general, symptom scores were low with both interventions, although – in absolute terms – somewhat higher with trauma-focused counseling than stress counseling, and also in the completer analysis (small-to-medium effects) than in the ITT analysis (no or small effects).

Primary Outcome. The total score of interviewer-rated PTSS did not significantly differ between trauma-focused counseling and stress counseling, nor was there a significant group difference in scores of individual PTSD symp-

Table 2. Baseline characteristics of the 190 study participants per type of intervention

	Trauma-focused counseling (n = 97)	Stress counseling (n = 93)	p value for difference
Age, years	60.30±10.84	59.51±11.65	0.627
Male sex, %	81.4	83.9	0.659
University or high school, %	25.8	11.8	0.140
Previous MI, %	8.4	13.0	0.307
ST elevation MI, %	72.2	70.3	0.781
Left ventricular ejection fraction, %	49.09±12.01	46.05±11.55	0.082
GRACE score	107.11±27.99	106.25±25.42	0.439
Body mass index	27.46±4.82	27.93±4.47	0.486
Diabetes, %	14.9	14.1	0.883
Hypertension, %	50.5	52.5	0.822
High cholesterol, %	50.0	41.3	0.234
Current smoker, %	43.8	44.6	0.910
Pain intensity (NRS)	8.04±1.60	7.80±1.73	0.320
Fear of dying (NRS)	5.74±2.67	4.80±3.12	0.026
Helplessness (NRS)	5.37±2.74	5.62±2.59	0.506
PTSD screen positive, %	14.3	7.1	0.123
Lifetime depression, %	27.4	29.3	0.764
Cognitive depressive symptoms	2.78±2.87	2.71±2.81	0.891
Antidepressant medication, %	10.3	5.4	0.207
Acute stress disorder symptoms	17.12±10.60	15.35±8.87	0.269

Continuous data represent mean values with standard deviations. GRACE, Global Registry of Acute Coronary Events; MI, myocardial infarction; NRS, numeric rating scale; PTSD, posttraumatic stress disorder. Note: PTSD screen, n = 176; GRACE score, n = 172; assessment of cognitive depressive symptoms, n = 149; acute stress disorder symptoms, n = 150. All other scales had less than 5% missing values.

tom cluster. This finding was confirmed in the ITT analysis and the completer analysis. In the entire sample, 1 patient (0.5%, 1/190) who was in the trauma-focused counseling group developed PTSD.

Secondary Outcomes. Self-rated PTSS were significantly higher with trauma-focused than stress counseling, both for the total score and for individual PTSD symptom clusters, except for re-experiencing symptoms in the ITT analysis. A significant difference with more depressive symptoms and more global psychological distress in the trauma-focused versus the stress counseling group emerged in the completer analysis, but not in the ITT analysis.

Exploratory Outcome. During follow-up, 7 patients had died (trauma-focused counseling: 3.1%, 3/97; stress counseling: 4.3%, 4/93), and 56 were hospitalized because of a CVD-related cause (48 elective/8 emergency hospitalizations). Fewer patients in the trauma-focused counseling group had a negative event (combined end point of hospitalizations/all-cause mortality) (28.9%, 28/97) than those in the stress counseling group (37.6%, 35/93). However, the crude odds ratio (OR) for hospitalizations/all-cause mortality showed no significant group difference (OR, 0.67; 95% CI, 0.37–1.23). Adjustment for sex and the GRACE score did not alter this finding.

Additional Assessments at Follow-Up

Patient Ratings. Almost two thirds of the 154 completers found the content of the information booklets to be either very helpful (14.3%) or quite helpful (48.1%), with another fourth saying it was a little bit helpful (26.6%). Only 6.5% found the information booklets not at all helpful and 4.5% could not answer this question. These ratings did not significantly differ between the trauma-focused and stress counseling groups (p = 0.86).

Mental Health Treatments. During follow-up, 26.3% (21/80) of the patients in the trauma-focused counseling group and 24.3% (18/74) in the stress counseling group had received at least 1 session of psychotherapy (p = 0.78 for group difference). At follow-up, antidepressants were taken by a similar portion of patients (p = 0.68) in the trauma-focused (10%, 8/80) and stress (8.1%, 6/74) coun-

Table 3. Differences in primary and secondary outcomes between both types of interventions

	Trauma-focused counseling		Stress counseling		*p*	ES
	mean	95% CI	mean	95% CI		
CAPS total (ITT) (*n* = 94/*n* = 89)	11.33	9.23–13.43	9.88	7.36–12.40	0.400	0.13
CAPS total (completer) (*n* = 80/*n* = 74)	11.64	9.42–13.85	9.55	7.25–11.86	0.210	0.21
CAPS re-experiencing (ITT) (*n* = 94/*n* = 89)	2.85	1.96–3.73	2.47	1.61–3.33	0.531	0.09
CAPS re-experiencing (completer) (*n* = 80/*n* = 74)	3.12	2.27–3.98	2.31	1.42–3.21	0.206	0.21
CAPS avoidance (ITT) (*n* = 94/*n* = 89)	3.49	2.56–4.43	2.22	1.11–3.34	0.108	0.25
CAPS avoidance (completer) (*n* = 80/*n* = 74)	3.52	2.60–4.44	2.30	1.35–3.26	0.077	0.29
CAPS hyperarousal (ITT) (*n* = 94/*n* = 89)	4.91	3.95–5.88	4.80	3.91–5.70	0.874	0.02
CAPS hyperarousal (completer) (*n* = 80/*n* = 74)	4.95	4.03–5.88	4.93	3.97–5.89	0.968	0.00
PDS total (ITT) (*n* = 94/*n* = 89)	6.54	4.95–8.14	3.74	2.39–5.08	0.017	0.39
PDS total (completer) (*n* = 76/*n* = 72)	6.96	5.62–8.30	3.69	2.31–5.06	0.001	0.55
PDS re-experiencing (ITT) (*n* = 94/*n* = 89)	1.77	1.29–2.25	1.08	0.45–1.29	0.081	0.31
PDS re-experiencing (completer) (*n* = 76/*n* = 72)	1.89	1.40–2.38	0.98	0.48–1.49	0.013	0.42
PDS avoidance (ITT) (*n* = 94/*n* = 89)	2.14	1.60–2.68	1.07	0.51–1.63	0.008	0.40
PDS avoidance (completer) (*n* = 76/*n* = 72)	2.34	1.77–2.92	1.00	0.41–1.59	0.002	0.52
PDS hyperarousal (ITT) (*n* = 94/*n* = 89)	2.59	2.09–3.10	1.74	1.19–2.30	0.023	0.33
PDS hyperarousal (completer) (*n* = 76/*n* = 72)	2.70	2.18–3.22	1.72	1.19–2.26	0.012	0.42
BDI total (ITT) (*n* = 94/*n* = 89)	6.01	4.98–7.03	4.71	3.65–5.77	0.075	0.25
BDI total (completer) (*n* = 76/*n* = 71)	6.31	5.24–7.39	4.49	3.37–5.61	0.024	0.38
SCL-90-R total (ITT) (*n* = 94/*n* = 89)	5.15	4.07–6.23	3.80	2.60–5.00	0.105	0.24
SCL-90-R total (completer) (*n* = 76/*n* = 72)	5.65	4.62–6.67	3.62	2.57–4.68	0.008	0.44

BDI, Beck Depression Inventory; CAPS, Clinician-Administered Posttraumatic Stress Disorder (PTSD) Scale; ES, effect size; ITT, intention to treat; PDS, Posttraumatic Diagnostic Scale; SCL, Symptom Checklist. All analyses were controlled for age, sex, education, Global Registry of Acute Coronary Events score, PTSD screen, lifetime depression, and pain during the acute coronary syndrome.

seling groups. Overall, a total of 29.2% (45/154) had received either psychotherapy and/or took antidepressants at the follow-up assessment.

Discussion

In patients at risk to develop ACS-induced PTSD, trauma-focused counseling showed no benefit for the prevention of clinician-rated PTSD/PTSS when controlled to an active control intervention at 3 months of follow-up. Specifically, we found neither statistical nor clinical evidence (effect size 0.13) that a single session of individual trauma-focused counseling was more effective than stress counseling for the prevention of the primary outcome interviewer-rated PTSS. Trauma-focused counseling did also no better than the active control intervention at reducing scores of the individual PTSD symptom clusters and the prevalence of a psychiatric diagnosis of PTSD. As the completer and ITT analyses yielded similar results, the findings regarding clinically assessed posttraumatic stress may be deemed representative for the whole study population, and not only for patients who completed the follow-up assessment. Taken together, the negative results from this trial speak against our primary hypothesis that trauma-focused counseling would be more effective than stress counseling avoiding trauma-focused terminology in preventing the incidence of clinician-rated PTSS.

Trial results were also negative in terms of our secondary outcomes self-rated PTSS, depressive symptoms, and global psychological distress, although different from findings for interviewer-rated posttraumatic stress. Among completers of the 3-month follow-up assessment, a significantly greater symptom burden was observed for patients after trauma-focused counseling compared to stress counseling. The group differences in depressive symptoms and global psychological distress became nonsignificant in the ITT analysis. Although still significantly different from the stress counseling group, self-rated PTSS in patients with trauma-focused counseling were also less severe in the ITT group than in the completers.

Patients with greater symptom burden might have felt more motivated to stay in the study, hoping for some kind of relief. Nonetheless, and contrary to our hypothesis, self-rated PTSS were significantly higher with trauma-focused counseling than stress counseling, both in the ITT and the completer analysis after 3 months. We offer 3 explanations for this finding. First, trauma-focused counseling may have activated traumatic memories of the cardiac event which were further consolidated through use of the self-help booklet in the aftermath of ACS [31]. Second, a stronger focus on the general management of psychosocial stress in the stress counseling manual might have yielded stress counseling more effective. Alternatively, 1 single session might not have allowed sufficient time for a constructive trauma-related intervention. Third, trauma-focused counseling might have framed the patients' attribution of stress symptoms as traumatic such that self-rating items of ACS-induced PTSS could have triggered their specific attention. However, also the other self-report measures showed more psychiatric symptoms for patients who had received trauma-focused counseling, so this can be regarded a rather general negative effect of this type of intervention. In contrast to mental health outcomes, a smaller portion of patients with trauma-focused counseling than with stress counseling reached the combined exploratory end point of hospitalizations/all-cause mortality, although this difference was not significant.

Irrespective of the negative result of our trial, the specific content of the 2 active interventions, and how they might have affected psychological adaptation after ACS differently, the patients in our RCT showed remarkably low psychiatric symptoms at the follow-up. To compare, we previously observed in a consecutive sample from the same cardiology department a clearly higher prevalence of ACS-induced PTSD with the CAPS (3.6 vs. 0.5% in this RCT) [12] and almost twice as high a mean level of self-rated PTSS with the PDS (8.8. vs. 4.8 in this RCT) [4]. This is unexpected, since these observational studies included patients across the whole spectrum of distress intensity during ACS and not only patients at risk like in this RCT. Likewise, meta-analytic data show that 4% (95% CI, 3–5%) of patients will develop PTSD after ACS [3]. Moreover, a reanalysis of data from the above-mentioned observational sample [12] revealed a prevalence of interviewer-rated PTSD as high as 10.3% in the subsample of 39 patients who were assessed between 2 and 4 months after ACS with scores for pain, fear of dying, and helplessness corresponding to the eligibility criteria for MI-SPRINT. Without any scientific advisory for the management of patients with a high level of distress during ACS [6], the natural onset of ACS-induced PTSS/PTSD must currently be viewed the most accurate outcome estimate of usual care for these patients. Therefore, a parsimonious interpretation of the main results from our RCT may be that both active interventions were more effective for the prevention of ACS-induced PTSS/PTSD than the current standard care of patients with high distress during ACS. Low depressive symptoms and low global psychological distress in both groups additionally support the interpretation that mental health benefits of either intervention exceeded those with usual care. The information booklets for self-guided help were perceived as helpful in the majority of patients and, indeed, almost 30% received either some form of psychotherapy or antidepressants, a potentially important explanation for the low symptom burden in patients in either group. A further explanation for the low prevalence of PTSD could be that inclusion criteria could have not covered all patients at high risk to develop PTSD as during the acute cardiac event some can present with transient amplified reactions, or, on the contrary, illness denial.

That only 1 patient developed clinical PTSD in our RCT is highly important in preventive terms, as PTSD, including ACS-induced PTSD, is a chronic disorder with little spontaneous remission [32]. In individuals diagnosed with acute stress disorder or PTSD [33], including ACS-induced PTSD [34], multiple-session trauma-focused cognitive behavioral therapy offered within a few months after a trauma is recommended to reduce traumatic stress symptoms. Effective early interventions might avert a need for this cost-intensive and, unfortunately, often unavailable form of psychotherapy. Therefore, replications are needed to demonstrate whether individual single-session early psychological counseling, applying similar approaches as in our RCT, would indeed be able to achieve this low prevalence of ACS-induced PTSD. Future interventions need to recognize that not all trauma survivors at high risk to develop PTSD can be identified in the acute phase, as, for instance, transient stress reactions are difficult to disentangle from early reactions that are precursors of subsequent PTSD [10]. Although they are still poorly developed, adequate screening tools could improve the early detection of posttraumatic responses [10]. Several demographic and psychosocial factors have been shown to predict ACS-induced PTSS in addition to high acute distress during ACS [30], but the extent to which the tailoring of early interventions can benefit from this knowledge is unknown. Moreover, a combined approach offering preventive

means in hospital and treatment after discharge might reach a greater share of distressed ACS survivors in need for psychological intervention. Of the patients approached by study staff to participate in the trial, 62.5% (444/710) agreed for in-person screening. Although this enrollment rate is somewhat higher than the 43.1% in our previous observational study [12], we cannot exclude the possibility that patients at higher risk for PTSD were more likely to have declined trial participation or were more prevalent amongst those excluded based on hospital charts and early discharge.

We should not leave unmentioned the current debate in the field as to whether traditional conceptualizations of PTSD are suitable for trauma survivors with a somatic diagnosis, including injury-related critical illness, cancer, or cardiac diseases [35–37]. Traditional PTSD screening instruments or clinical interviews, such as the PDS and CAPS used in our study, are keyed to a single medical event in the past (i.e., the diagnosis and acute care/intervention for ACS), but they do not capture present and future-oriented re-experiencing symptoms of PTSD due to enduring threats of recurrence and functional decline in the wake of ACS; likewise avoidance and hyperarousal symptoms may also present in a different manner and with different psychological consequences [37]. A recent study confirmed the clinical importance of enduring somatic threat for PTSS in patients with ACS showing that a high level of acute distress at hospital admission was only predictive of ACS-induced PTSS 1 month later in those patients who also perceived ongoing cardiac threat in the form of anxious thoughts and feelings about cardiac symptoms [38]. A research agenda has been proposed to develop a taxonomy to recategorize the gamut of distressing psychological symptoms prevalent in survivors of a medical disease beyond the levels of PTSD and other psychiatric disorders [35]. In this regard, the Diagnostic Criteria for Psychosomatic Research are a helpful tool as they translate psychological manifestations and illness behaviors like health anxiety, illness denial, and persistent somatization, all relevant to medically induced PTSD, into operational categories [39].

The strengths of this study are the RCT design, the blinded assessment of PTSS by a clinical interview, and the use of valid and reliable self-rated questionnaires to assess patient-reported outcomes in terms of mental health. There are also several limitations of our RCT. Female sex is a predictor of ACS-induced PTSS [11, 29], but the vast majority of our study participants were men. We excluded patients with severe somatic comorbidity and clinical depression who may be more vulnerable to develop PTSS. However, during the acute phase of a cardiac disease, it is also difficult to diagnose a clinical depression since the patient could present a bias of recall. As our counseling sessions pursued a pragmatic approach that could easily be transferred to clinical routine within a busy acute coronary care setting, there were no strict requirements for adherence to the counseling protocol. Counseling could be interrupted or parts of it postponed if medical operations required this. Related to this and, although originally planned, it was not practical in our setting to use formal means to measure treatment fidelity, as a video or sound recording would have unduly interfered with the narrow spatial conditions and busy activity on the coronary care unit. We recruited patients in only 1 tertiary university center, which limits the generalization of findings to other care settings. The trial's enrollment target could not be achieved, but this should not affect the overall observed low prevalence of PTSS/PTSD.

We conclude from the negative result of our trial that one session of individual early trauma-focused counseling in patients with high acute distress during ACS was not more effective than stress counseling for the prevention of interviewer-rated ACS-induced posttraumatic stress. Self-rated PTSS scores were even higher after trauma-focused counseling. However, both interventions resulted in strikingly lower PTSS levels and PTSD prevalence rates when compared to those from previous observational studies. Patients with high distress during ACS might thus benefit from early pragmatic psychological counseling in terms of ACS-induced PTSS/PTSD prevention. To improve treatment effects, the content of such interventions needs further exploration, which facets to include or to exclude. Our study suggests that it might be advisable in a 1-session intervention to avoid focusing on the potential traumatic aspects of ACS and instead encourage more resource-focused stress counseling.

Acknowledgments

The trial was funded by grant No. 140960 from the Swiss National Science Foundation to R.K. (principal investigator), J.-P.S., U.S., H.Z., and J.B. Additional funding came from the Teaching and Research Directorate, Bern University Hospital, Switzerland.

Disclosure Statement

No author or any immediate family member has financial relationships with commercial organizations that might present an apparent conflict of interest in the material presented.

References

1 American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, ed 5. Arlington, American Psychiatric Publishing, 2013.
2 Whitehead DL, Strike P, Perkins-Porras L, Steptoe A: Frequency of distress and fear of dying during acute coronary syndromes and consequences for adaptation. Am J Cardiol 2005;96:1512–1516.
3 Edmondson D, Richardson S, Falzon L, Davidson KW, Mills MA, Neria Y: Posttraumatic stress disorder prevalence and risk of recurrence in acute coronary syndrome patients: a meta-analytic review. PLoS One 2012;7:38915.
4 Von Känel R, Hari R, Schmid JP, Wiedemar L, Guler E, Barth J, Saner H, Schnyder U, Begré S: Non-fatal cardiovascular outcome in patients with posttraumatic stress symptoms caused by myocardial infarction. J Cardiol 2011;58:61–68.
5 Wasson LT, Shaffer J, Alcántara C, Schwartz JE, Edmondson D: The association of posttraumatic stress disorder and quality of life during the first year after acute coronary syndrome. Int J Cardiol 2014;176:1042–1043.
6 Edmondson D, von Känel R: Post-traumatic stress disorder and cardiovascular disease. Lancet Psychiatry 2017;4:320–329.
7 Rose S, Bisson J, Churchill R, Wessely S: Psychological debriefing for preventing posttraumatic stress disorder (PTSD). Cochrane Database Syst Rev 2002;2:CD000560.
8 Bisson JI, Brayne M, Ochberg FM, Everly GS Jr: Early psychosocial intervention following traumatic events. Am J Psychiatry 2007;164:1016–1019.
9 Witteveen AB, Bisson JI, Ajdukovic D, Arnberg FK, Bergh Johannesson K, Bolding HB, Elklit A, Jehel L, Johansen VA, Lis-Turlejska M, Nordanger DO, Orengo-García F, Polak AR, Punamaki RL, Schnyder U, Wittmann L, Olff M: Post-disaster psychosocial services across Europe: the TENTS project. Soc Sci Med 2012;75:1708–1714.
10 Bryant RA: Early intervention after trauma; in Schnyder U, Cloitre M (eds): Evidenced Based Treatments for Trauma-Related Psychological Disorders: A Practical Guide for Clinicians. Cham, Springer International Publishing, 2015, pp 125–142.
11 Roberge MA, Dupuis G, Marchand A: Posttraumatic stress disorder following myocardial infarction: prevalence and risk factors. Can J Cardiol 2010;26:e170–e175.
12 Guler E, Schmid JP, Wiedemar L, Saner H, Schnyder U, von Känel R: Clinical diagnosis of posttraumatic stress disorder after myocardial infarction. Clin Cardiol 2009;32:125–129.
13 Wiedemar L, Schmid JP, Müller J, Wittmann L, Schnyder U, Saner H, von Känel R: Prevalence and predictors of posttraumatic stress disorder in patients with acute myocardial infarction. Heart Lung 2008;37:113–121.
14 Whitehead DL, Perkins-Porras L, Strike PC, Steptoe A: Post-traumatic stress disorder in patients with cardiac disease: predicting vulnerability from emotional responses during admission for acute coronary syndromes. Heart 2006;92:1225–1229.
15 Meister R, Princip M, Schmid JP, Schnyder U, Barth J, Znoj H, Herbert C, von Känel R: Myocardial Infarction – Stress PRevention INTervention (MI-SPRINT) to reduce the incidence of posttraumatic stress after acute myocardial infarction through trauma-focused psychological counseling: study protocol for a randomized controlled trial. Trials 2013;14:329.
16 Herbert C, Wetmore A: Overcoming Traumatic Stress. A Self-Help Guide Using Cognitive Behavioral Techniques. New York, Basic Books, 2008.
17 Ehlers A, Clark DM, Hackmann A, McManus F, Fennel M, Herbert C, Mayou R: A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. Arch Gen Psychiatry 2003;60:1024–1032.
18 Freedland KE, Mohr DC, Davidson KW, Schwartz JE: Usual and unusual care: existing practice control groups in randomized controlled trials of behavioral interventions. Psychosom Med 2011;73:323–335.
19 Hari R, Begré S, Schmid JP, Saner H, Gander ML, von Känel R: Change over time in posttraumatic stress caused by myocardial infarction and predicting variables. J Psychosom Res 2010;69:143–150.
20 Von Känel R: Psychosocial stress and cardiovascular risk: current opinion. Swiss Med Wkly 2012;142:w13502.
21 Fox KA, Dabbous OH, Goldberg RJ, Pieper KS, Eagle KA, Van de Werf F, Avezum A, Goodman SG, Flather MD, Anderson FA Jr, Granger CB: Prediction of risk of death and myocardial infarction in the six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). BMJ 2006;333:1091.
22 Beck AT, Steer RA: Manual for the Beck Depression Inventory. San Antonio, Psychological Corporation, 1993.
23 Barth J, Paul J, Klesse C, Bengel J, Härter M: Die Diskriminationsleistung des Beck-Depressions-Inventars (BDI) hinsichtlich depressiver Störungen bei Patienten mit einer körperlichen Erkrankung. Z Klein Psychol Psychother 2007;36:73–82.
24 Bryant RA, Moulds ML, Guthrie RM: Acute Stress Disorder Scale: a self-report measure of acute stress disorder. Psychol Assess 2000;12:61–68.
25 Franklin CL, Sheeran T, Zimmerman M: Screening for trauma histories, posttraumatic stress disorder (PTSD), and subthreshold PTSD in psychiatric outpatients. Psychol Assess 2002;14:567–571.
26 Schnyder U, Moergeli H: German version of Clinician-Administered PTSD Scale. J Trauma Stress 2002;15:487–492.
27 Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, Keane TM: The development of a Clinician-Administered PTSD Scale. J Trauma Stress 1995;8:75–90.
28 Foa EB, Cashman L, Jaycox L, Perry K: Validation of a self-report measure of posttraumatic stress disorder: the Posttraumatic Diagnostic Scale. Psychol Assess 1997;9:445–451.
29 Klaghofer R, Brähler E: Konstruktion und teststatistische Prüfung einer Kurzform der SCL-90-R. Z Klin Psychol Psychiatr Psychother 2001;49:115–124.
30 Gander ML, von Känel R: Myocardial infarction and post-traumatic stress disorder: frequency, outcome, and atherosclerotic mechanisms. Eur J Cardiovasc Prev Rehabil 2006;13:165–172.
31 Bisson J, Andrew M: Psychological treatment of post-traumatic stress disorder (PTSD). Cochrane Database Syst Rev 2007;3:CD003388.
32 Abbas CC, Schmid JP, Guler E, Wiedemar L, Begré S, Saner H, Schnyder U, von Känel R: Trajectory of posttraumatic stress disorder caused by myocardial infarction: a two-year follow-up study. Int J Psychiatry Med 2009;39:359–376.
33 Roberts NP, Kitchiner NJ, Kenardy J, Bisson JI: Systematic review and meta-analysis of multiple-session early interventions following traumatic events. Am J Psychiatry 2009;166:293–301.
34 Shemesh E, Koren-Michowitz M, Yehuda R, Milo-Cotter O, Murdock E, Vered Z, Shneider BL, Gorman JM, Cotter G: Symptoms of posttraumatic stress disorder in patients who have had a myocardial infarction. Psychosomatics 2006;47:231–239.
35 Weinert C, Meller W: Medical post-traumatic stress disorder: catching up with the cutting edge in stress research. Crit Care 2007;11:118.
36 Mehnert A, Berg P, Henrich G, Herschbach P: Fear of cancer progression and cancer-related intrusive cognitions in breast cancer survivors. Psychooncology 2009;18:1273–1280.
37 Edmondson D: An enduring somatic threat model of posttraumatic stress disorder due to acute life-threatening medical events. Soc Personal Psychol Compass 2014;8:118–134.
38 Meli L, Alcántara C, Sumner JA, Swan B, Chang BP, Edmondson D: Enduring somatic threat perceptions and post-traumatic stress disorder symptoms in survivors of cardiac events. J Health Psychol, Epub ahead of print.
39 Fava GA, Cosci F, Sonino N: Current psychosomatic practice. Psychother Psychosom 2017;86:13–30.